



The Future Is Not What It Used To Be

September 22, 2004

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SAND2004-4536P

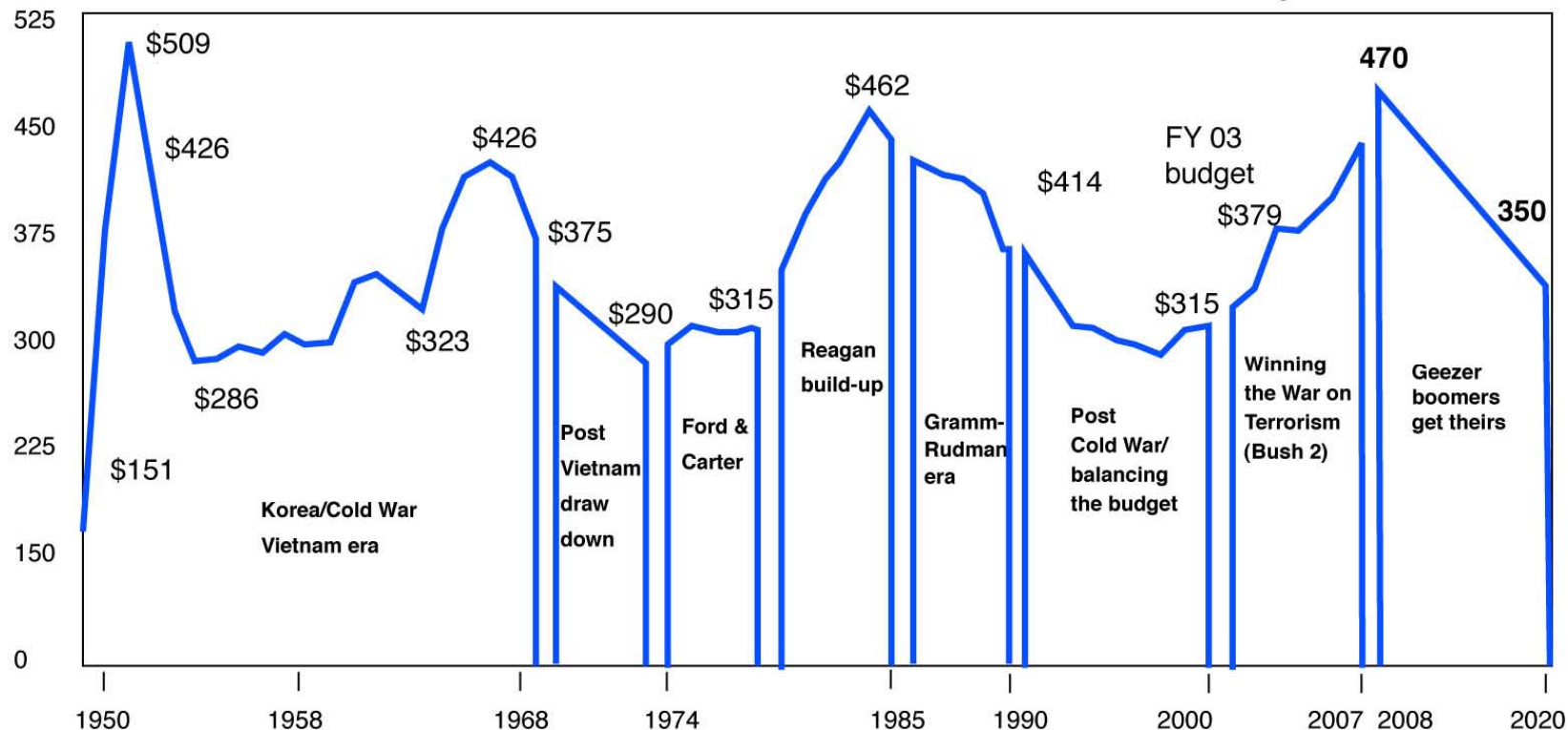
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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 22 SEP 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE The Future Is Not What It Used To Be				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Sandia National Laboratories				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADM201931, Non-Ideal Air Blast Database Review Final Report and Proceedings of the NIAB Workshop Held in Kirtland AFB, New Mexico on 20-24 September 2004. , The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 28	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

DoD budget authority cycles

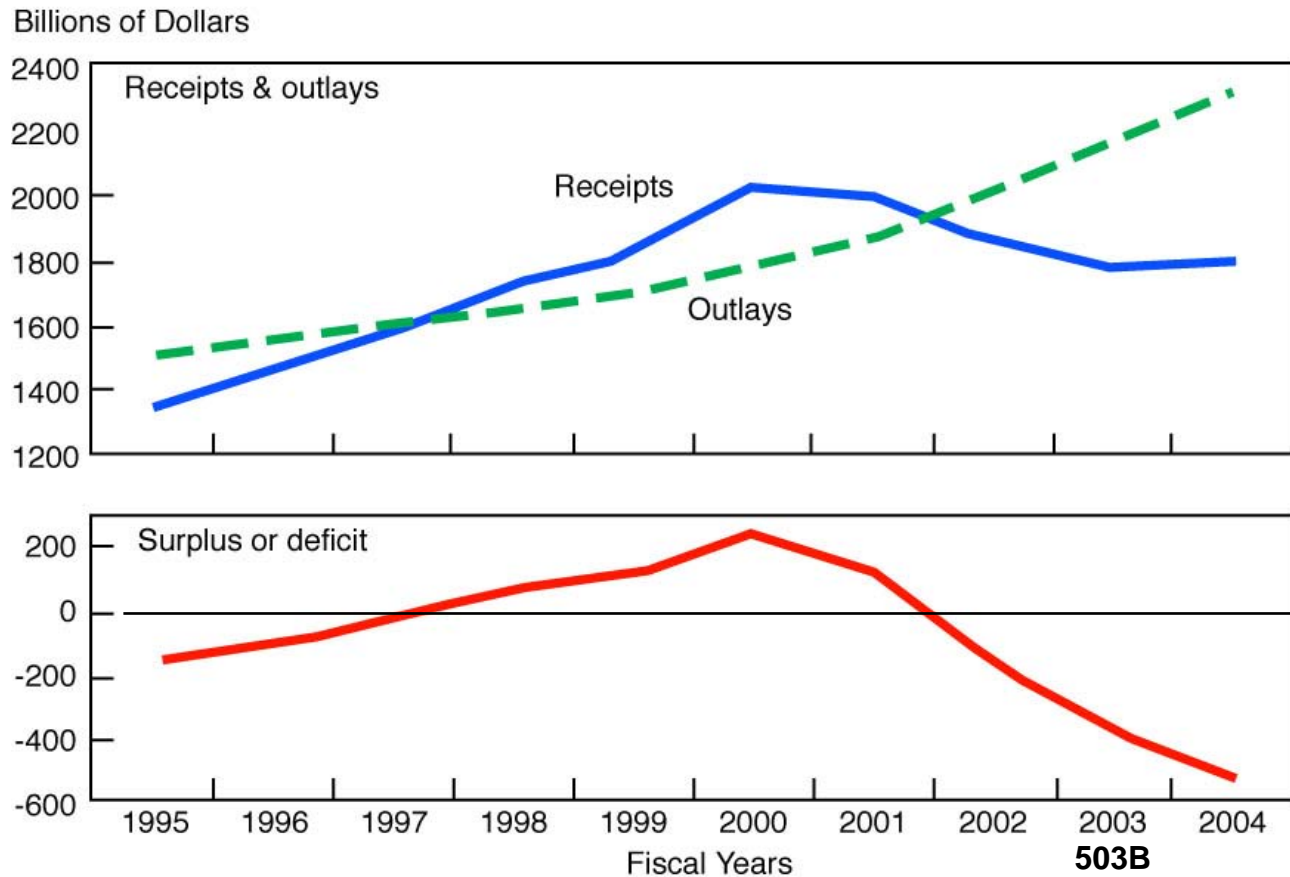
Constant 2003
\$ in Billions

DoD near
a peak



DoD funding has a 20-year cycle

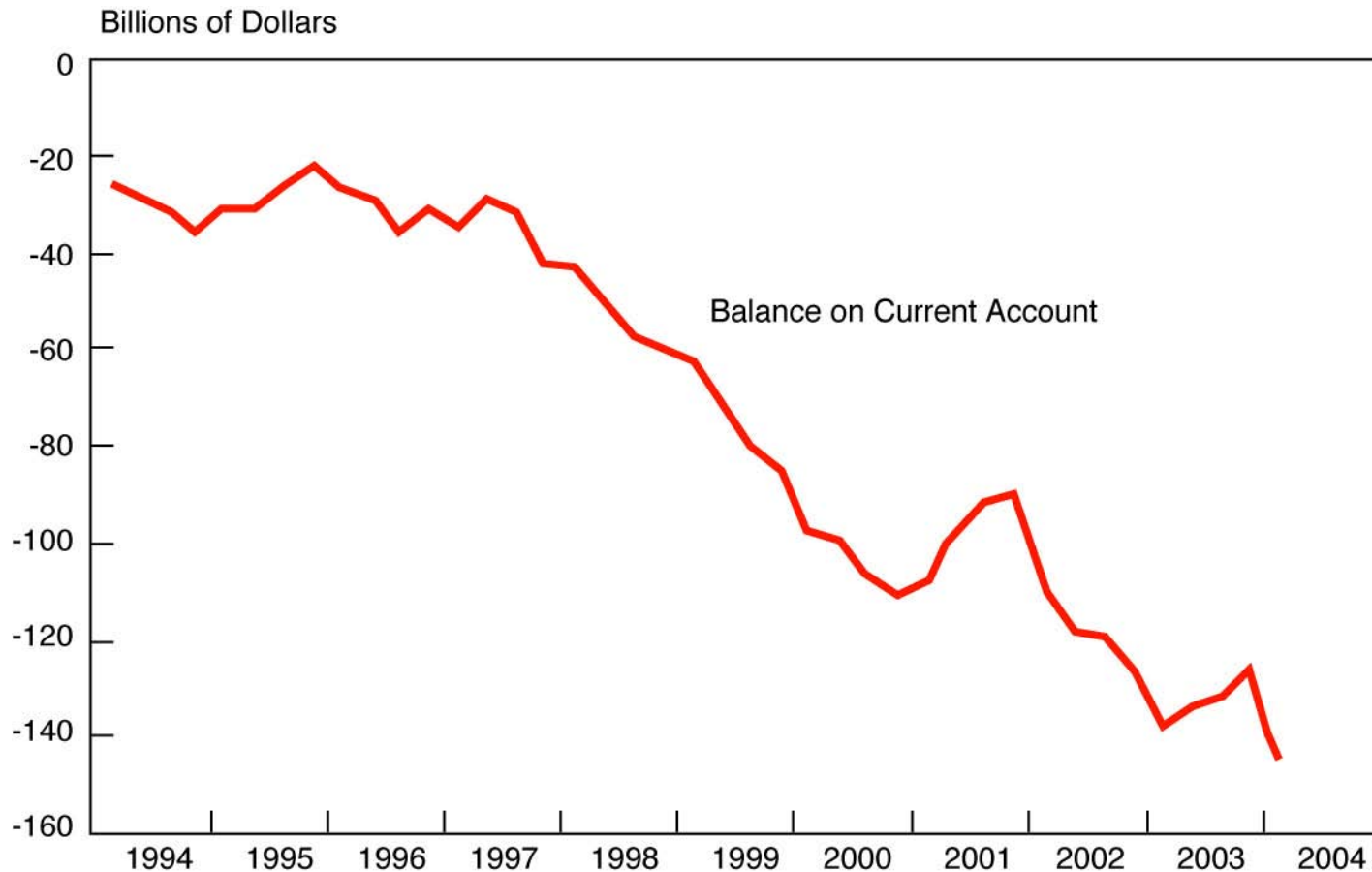
Deficit is high and growing



Sources: Department of Treasury & OMB

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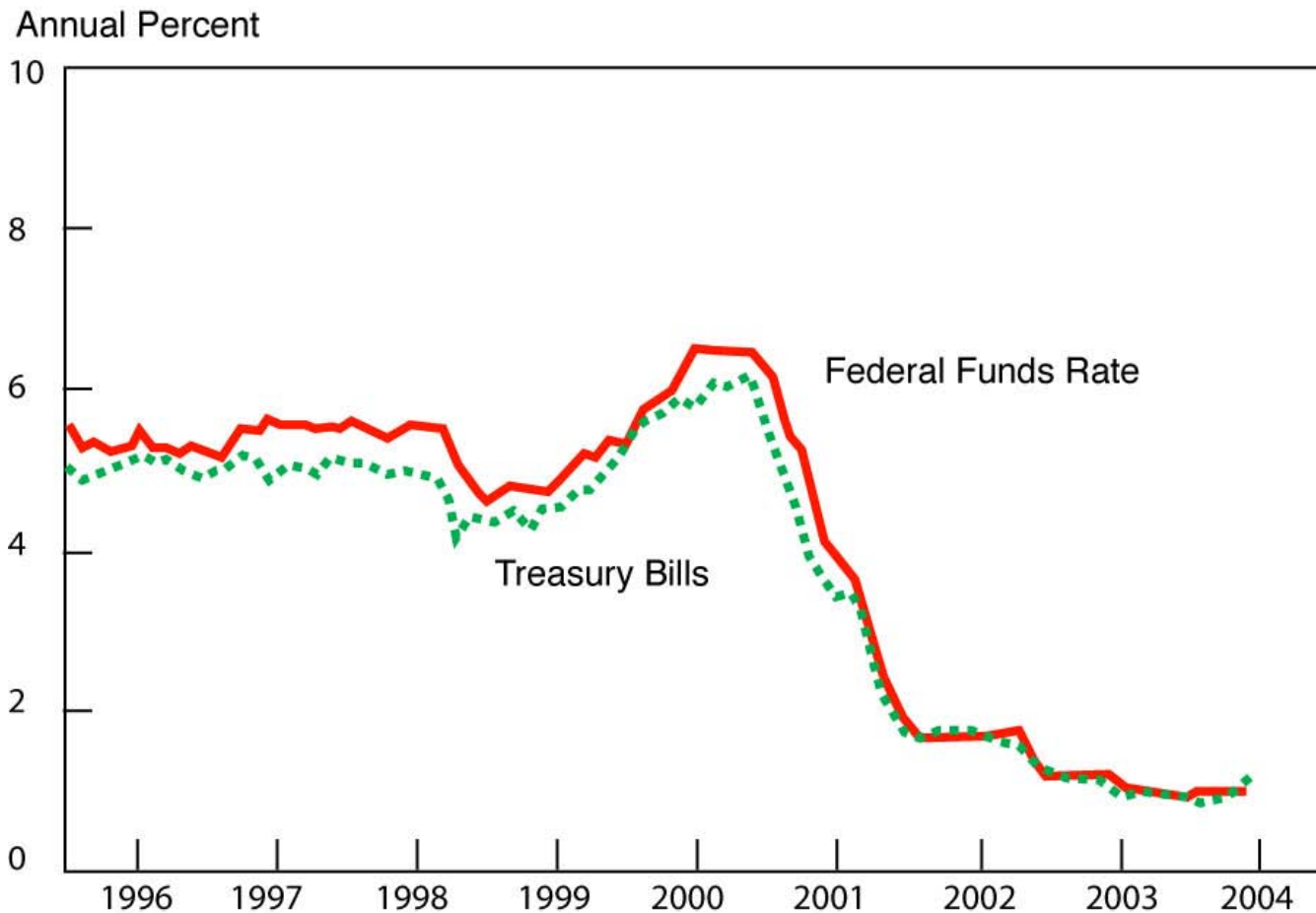
Foreigners are buying our debt and we buy their stuff



Source: Department of Commerce

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Interest rates are low and will increase

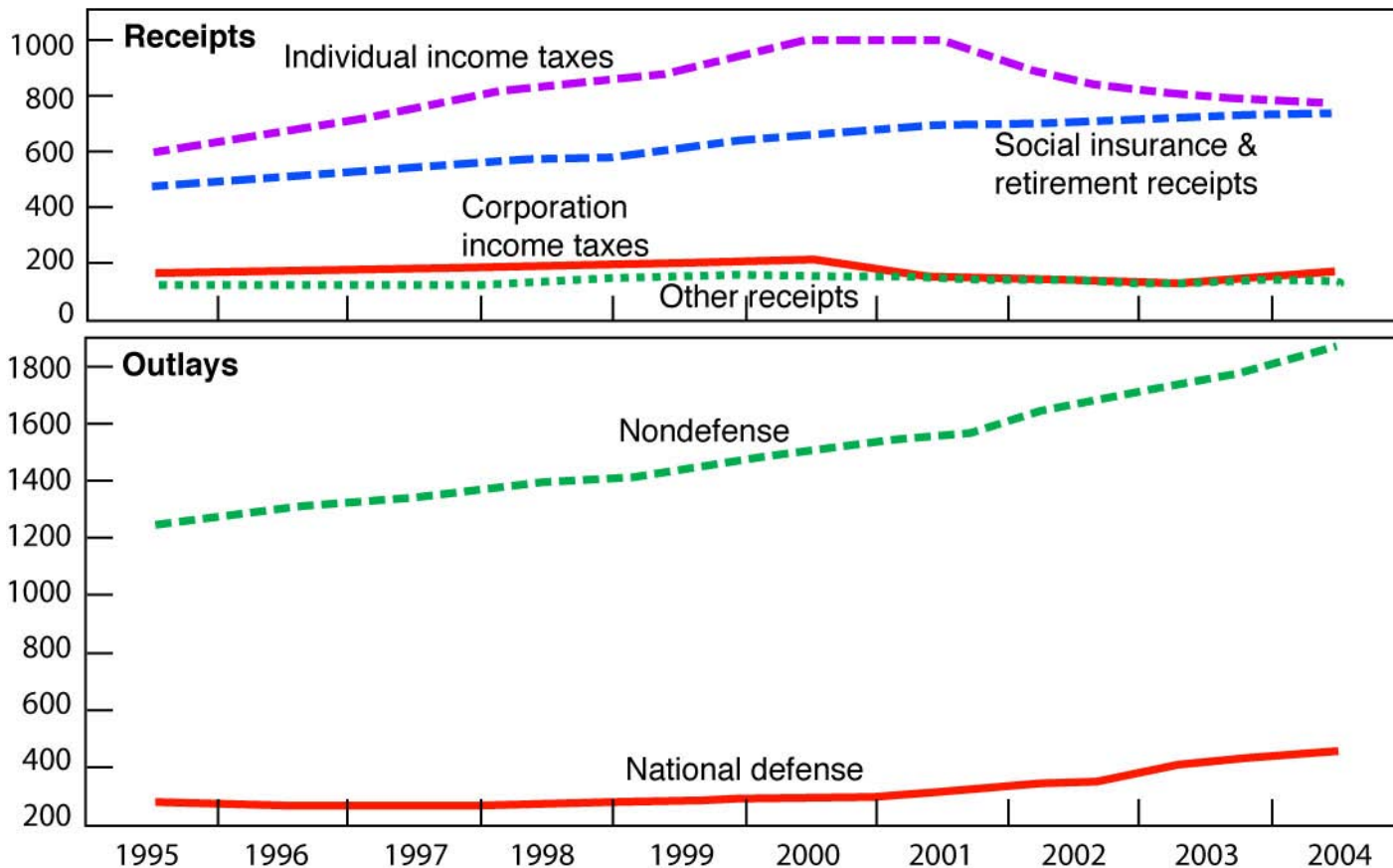


Source: Council of Economic Advisors

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Non-defense* will grow

Billions of Dollars



*(health, Medicaid, income security, social security, interest, other)

Sources: Department of Treasury & OMB

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Technologies from cold war S&T investment

(from OSD DT&E / 03)

Stealth

High performance fighter aircraft, jet engines

Spy satellites

Hypersonics

Terrain matching navigation

High precision navigation

High performance armor

High energy lasers

High power microwave weapons

Advanced signal processing (acoustic & radar)

Advanced simulators

Night vision devices

Synthetic Aperture & MTI Radar

High bandwidth communications

Unbreakable codes

High performance jammers

So what is the plan?

AF -- UAVs -- Robots

Army -- FCS -- Robots

**Navy -- guided missiles from subs --
Robots**

**SOF -- sensor network
assisted humans**



How will the nation spend its money on R&D?

- **Energy** → plentiful, clean, affordable
- **Environment** → clean, affordable
- **Education** → available, effective, affordable
- **Transportation** → clean, safe, affordable
- **Manufacturing** → flexible, clean, affordable
- **Health Care** → effective, affordable
- **Security** → effective, affordable, preserve civil liberties



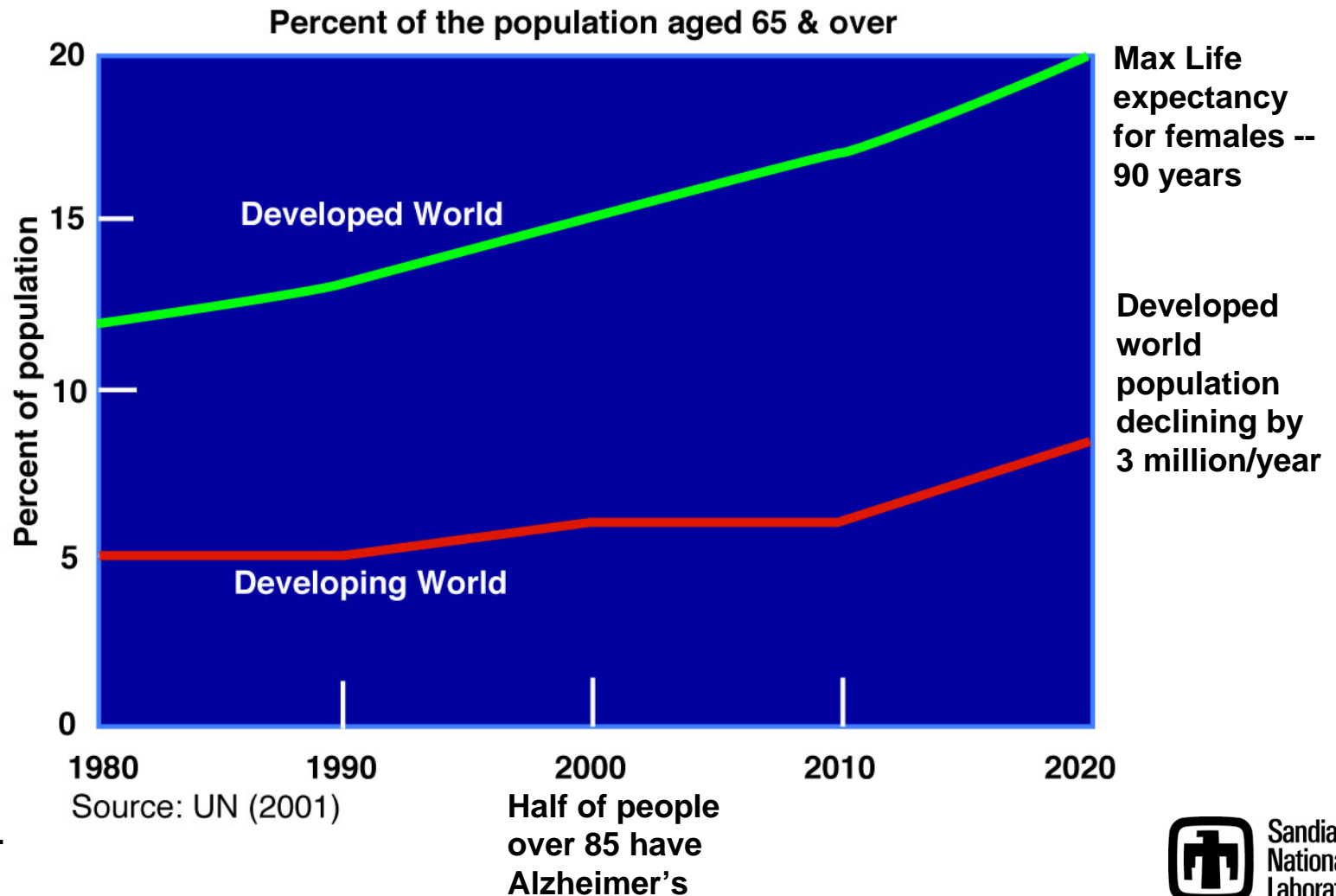
The barriers to affordable solutions are often technical

- Materials
- Computing
- Sensors
- Information technology
- Software
- Manufacturability
- **Biotechnology**

*But, it is also the people, stupid!
or*

Is it stupid people?

Demographics point to a major change





Population growth & abrupt climate change could place heavy demands on water supplies

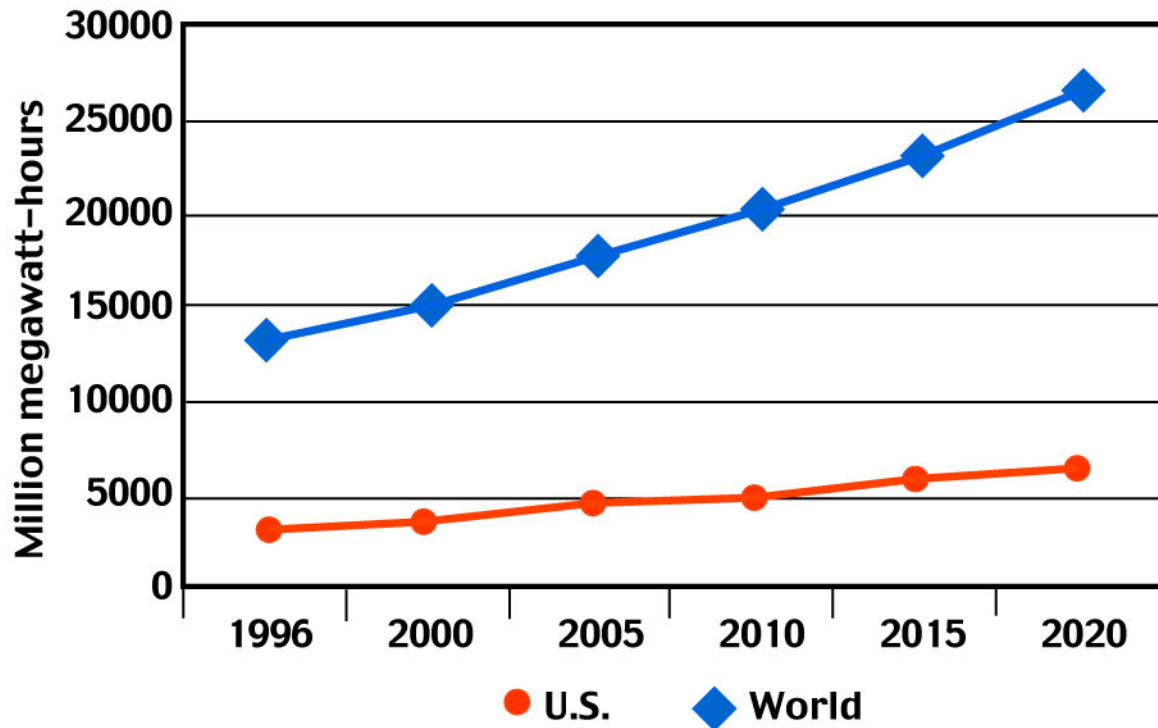
- **Biological contaminants are increasing**
- **Chemicals in water system**
- **Heavy metals**
- **Ocean pollution**
- **Aquifer depletion (in Albuquerque, ~30 feet in 10 years)**
- **Abrupt climate change?**

Water availability is likely to become one of the most pressing and contentious resource issues of this century

**- By the year 2025, 48 countries containing
3 billion people will face fresh water shortages**

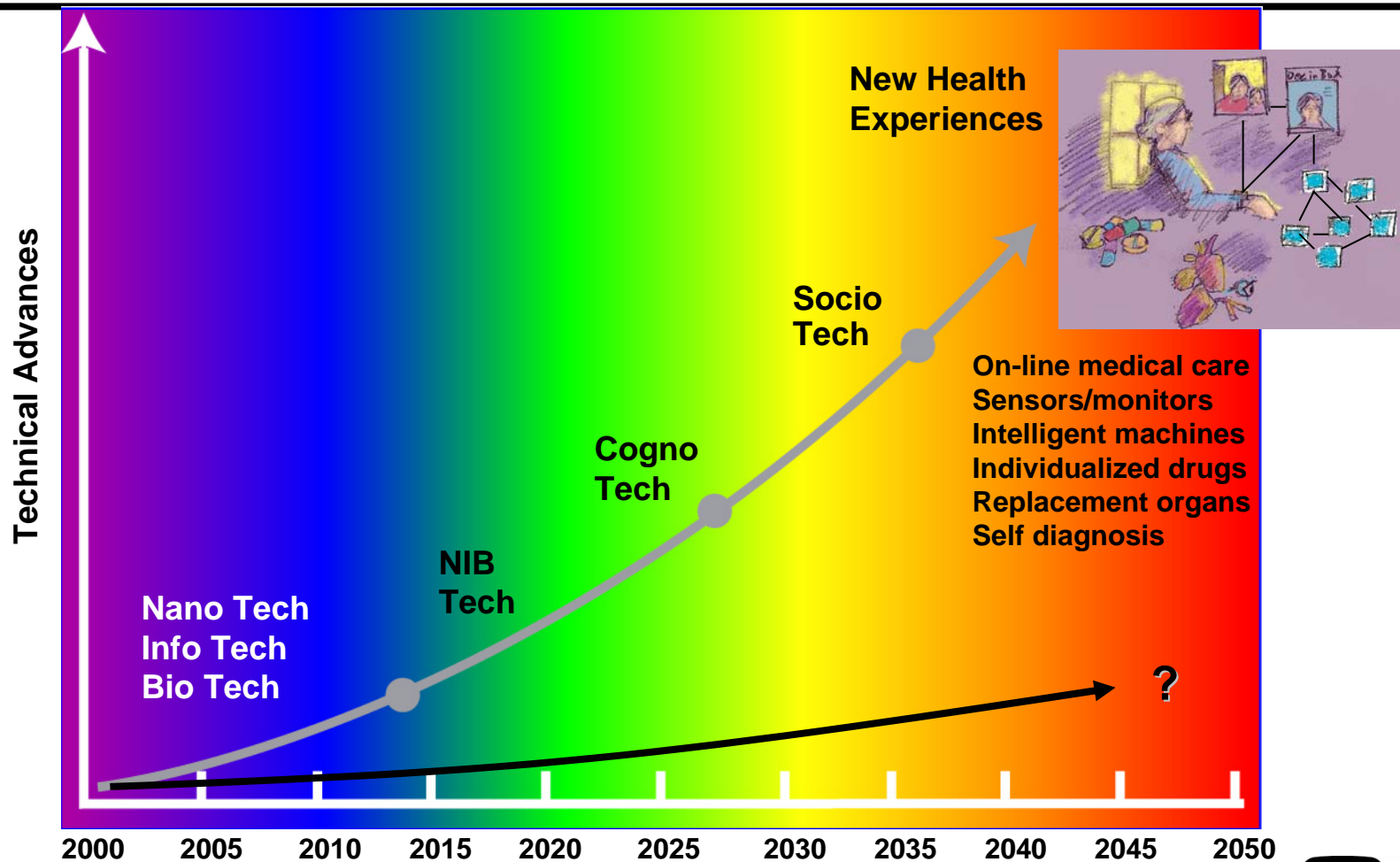
Source: CIA / DoI / 2001

U.S. / world electricity demand



Source: World Energy Council and EIA projections

Tomorrow's health care needs will drive tech investments





The vital issues

- Energy
- Environment (water)
- Education
- Economics
- Transportation
- Health Care

Security

- *Develop a strategic context*
- *Apply a system architecture*
- *Find and kill the terrorists*
- *Win the global war of ideas*



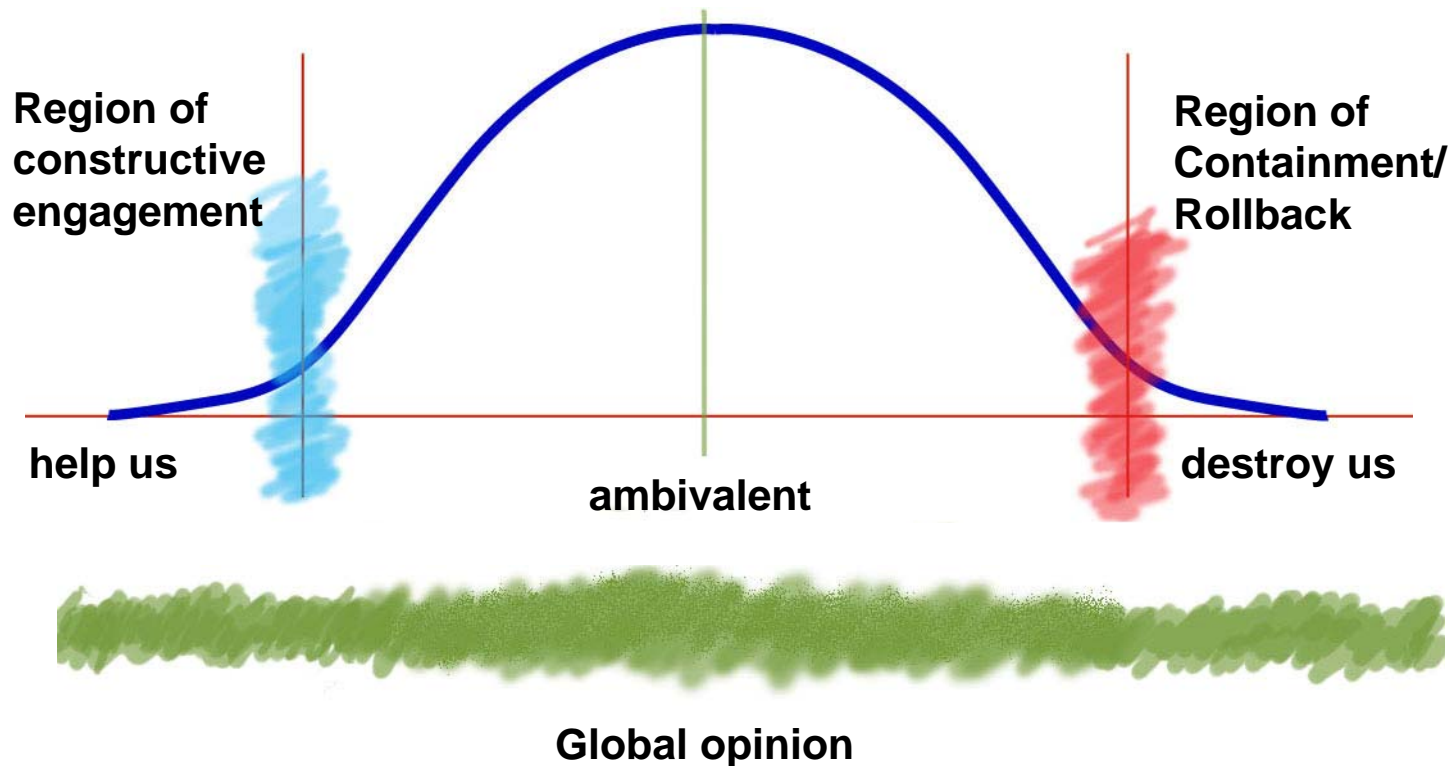
VIDEO



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The Global War Of Ideas (GWOI)



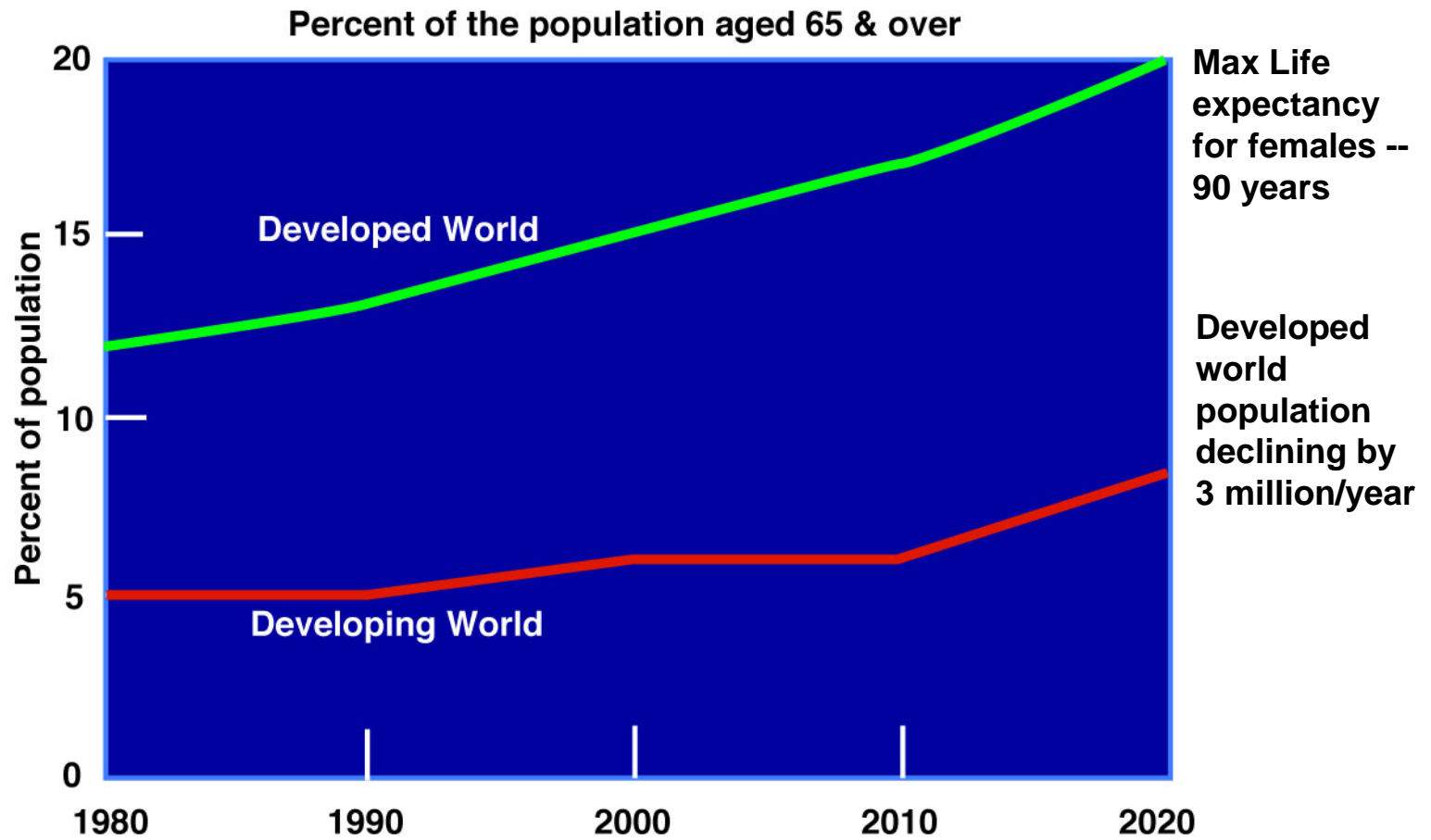
The global war within Islam will be fought on three battlegrounds:
Engagement, Containment/Rollback, Global Opinion



Concepts for GWOI

- **Quantify the distribution: help us -- ambivalent -- destroy us**
- **Targeted strategy**
- **Disrupt mobilization process**
- **Work through third party moderates**
- **Infiltrate the cellular network structure**

Demographics point to a major change



Max Life expectancy for females -- 80 years

Source: UN (2001)

Half of people over 85 have Alzheimer's

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The barriers to affordable solutions are often technical

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- Manufacturability
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or
Is it stupid people?



Kinetic weapon needs against hard targets

- **Physical destruction of HDBT with penetrating weapons**
 - **RNEP**
 - **Multiple, large conventional bombs.**
 - **Large Kinetic Energy impactors/rods/jets**
- **Reliable smart fuses for fast penetrators**
- **Functional defeat with exquisite intelligence (persistent, ubiquitous, all weather ISR) for location, characterization, and BDA.**
- **Chem and bio weapons defeat with radiation and long duration high temp**



Kinetic weapons against soft fixed & relocatable targets needs

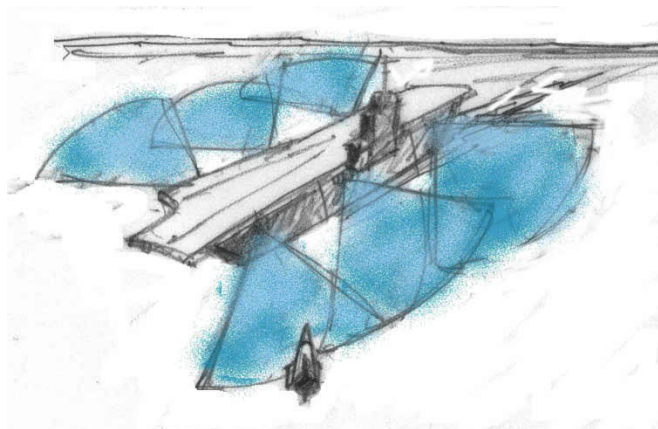
- **Smarter weapons that understand location, status, effects, and communicate for real time connectivity and BDA could be developed**
- **Precision delivered hypersonic masses, rods, and flechetts offer the potential for high lethality and low colateral damage**
- **Sensor controlled and multimode munitions**
- **Pre-deployed on-site sensors or short range weapons for precision strike and rapid response eg: UGS, NETFIRE, SOF**
- **Perch, search, lurch**

Will military application of beams ever be real?

- Speed of light weapons including lasers, HPM, & particle beams, non-lethal weapons



HPM



Proton Shield



**Sensory overload
from combined effects**



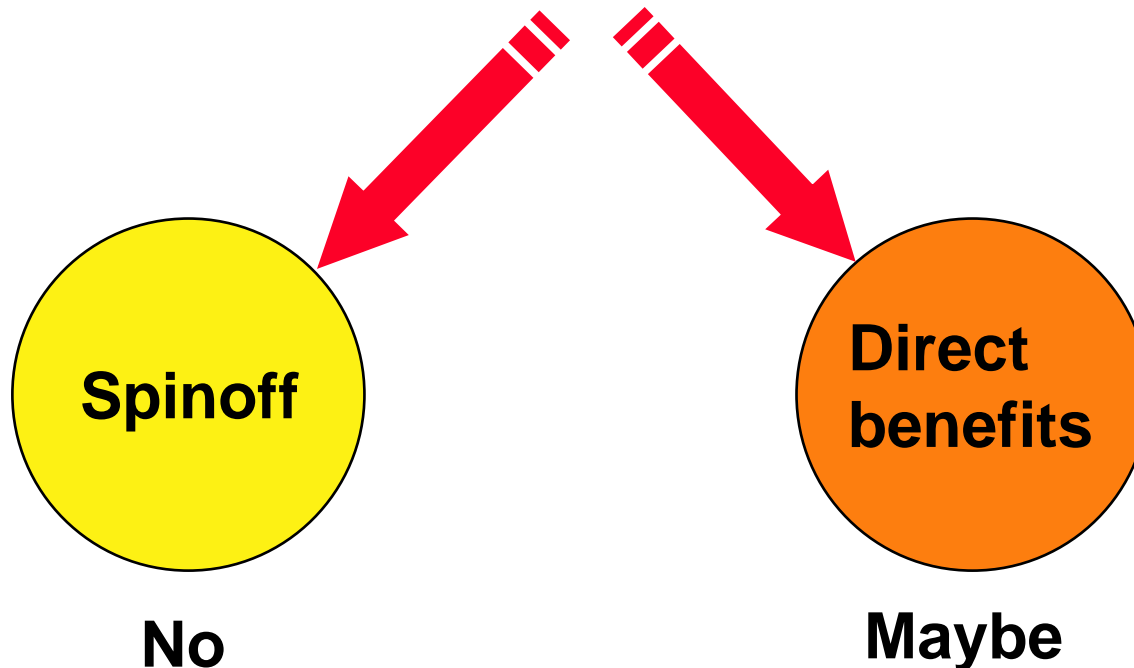
Summary of needs

- Nuclear and non-nuclear penetrators
- Diggers/sensors for underground warfare
- Brilliant weapons/location, status, effects, comm, BDA
- Agent defeat weapons
- Info ops/functional kill/asymmetric war
- Non lethal weapons



Role of National Labs?

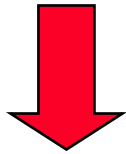
- Affordable benefits?
- Relevance, timely, cost effective?





More C³ needed for relevance

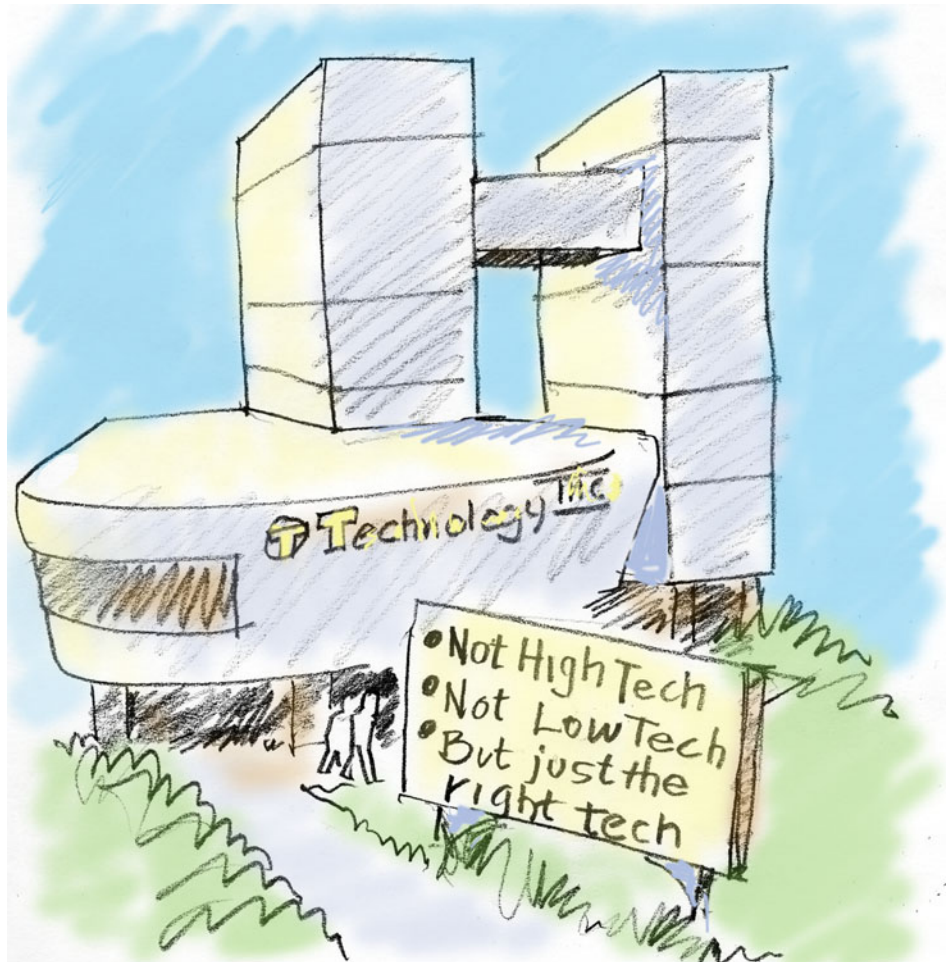
- Consolidate to sustain and enhance competencies
- Cooperate on shared problems
- Compete for applications



- The key to relevance is rapid application of the right tech

Research → Development → Application

The right tech





Role of National Labs

- Accelerate solution realization
- Share cost and risk
- Enhance critical capabilities
- Provide focus
- Integrate biological, social, and physical sciences in system solutions

Catalyze **interdisciplinary** teams for system solutions

Government - **U**niversities - **I**ndustry - **L**ab - **T**eams

GUILT



Conclusion

- **The rate of political, economic, social, tech change is increasing**
- **The driving forces for solutions are inescapable**
- **Advances in technology can be part of the solution**
- **Rapid/agile/relevant deployment of solutions is essential**
- **GUILT offer a way to speed and affordability**

Prepare for inevitable surprises